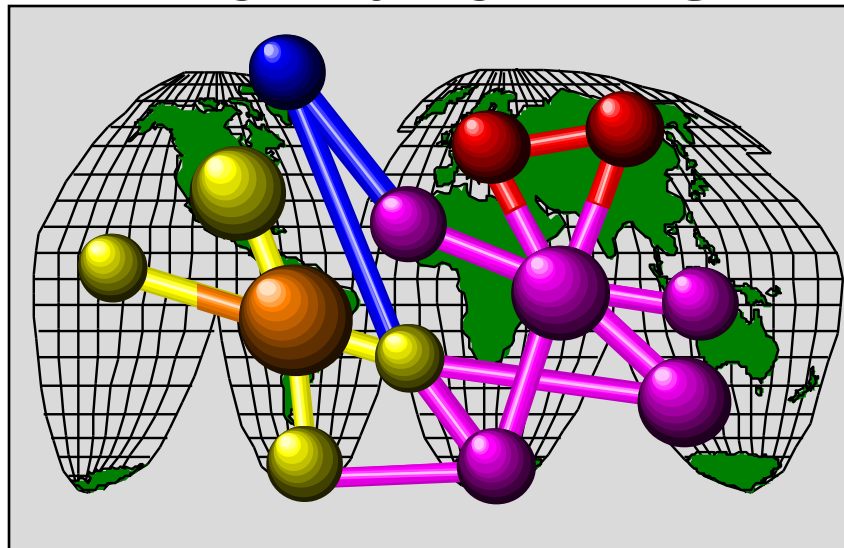


Global Information Grid (GIG) Architecture and Reference

Model ~~Information~~ Brief



Department of Defense
Terry Hagle, Office of DoD CIO/A&I

607-0235

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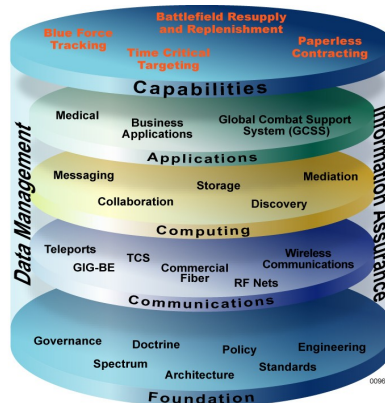
What Is The Global Information Grid?

The GIG Is

- *A transforming construct for managing DOD Information Technology*
- *Essential to the achievement of network-centric operations*
- *Inherently a system of systems (federated and integrated processes)*

• *An architectural balance between interoperability and security*

• *In I*



The GIG Is Not

- *A single program or service contract “as is” Enterprise architecture*
- *A requirements bound Grand Design*
- *An “all at once” implementation*
- *An excuse for bigger budgets*



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Scope of CIO Responsibilities

CIO does **not** determine the warfighting requirement, but is required to **assess the impact** of the warfighting requirement on the enterprise IT infrastructure

CIO briefing to JROC, March 2000



Global Information Grid Architecture

DoD's Information Technology Architecture DoD CIO

"Develop, maintain, and facilitate the implementation of a sound and integrated information technology architecture for the executive agency"

(40 U.S.C. Section 1425)

- Version 1.0 -- AS-IS Architecture
- Version 2.0 -- TO-BE Architecture
- NCOW Reference Model -
Transition Strategy



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GIG Architectures

GIG ARCHITECTURE VERSION 1.0

- An integrated Baseline Architecture
- C4ISR Arch Framework compliant
- Timeframe: 2001
- Single AOR scenario (USCENTCOM)
- Operational level (JTF operations)
- First cut at describing PSA functions, the JOA, systems templates, and KIPs
- Approved August 2001

GIG ARCHITECTURE VERSION 2.0

- An integrated Objective Architecture
- C4ISR Arch Framework compliant
- Timeframe: 20XX
- Multiple AOR scenario (USNORTHCOM, USCENTCOM, CFC/USFK, SECDEF/OSD)
- Multiple use cases (Tactical, Operational, and Strategic)
- Architectural descriptions of Net-Centric concepts



Global Information Grid Architecture

Net-Centric Operations and Warfare Reference Model Transition Strategy



Reference Model Briefings

- Overview
- Reference Model Activity Decomposition
 - Service Oriented Architecture
 - Data Strategy
 - Information Assurance Strategy (TBD)
- Reference Model Use Cases
- Systems View
- Technical View



Why Build a Reference Model?

- ✓ Provide Program Managers (the target audience) **acquisition guidance** on what to make contractually binding beyond the *Joint Technical Arch (JTA)*.
 - Provide immediate utility without time-consuming analysis of the DoD Enterprise Architecture (GIG Architecture Versions 1 and 2)
 - Overcome difficulty of relating and applying a broad Enterprise Architecture to specific programs.
- ✓ Provide **common net-centric architectural constructs** congruent with the DoDAF.
- ✓ Establish a **common language and taxonomy** for NCOW concepts.
- ✓ Demonstrate and promote the **TPPU Vision**.
- ✓ Focus the GIG Arch **compliance** requirement
- ✓ Support evolution of the *DoD Architecture Framework* and the *JTA*



Building the Model is a collective DoD effort

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Integrated Dictionary

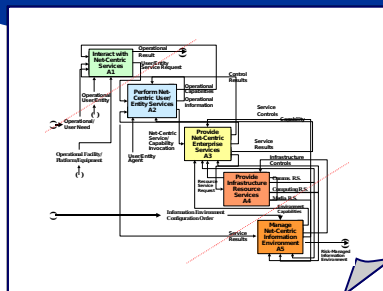
BETA 1.0

ALL

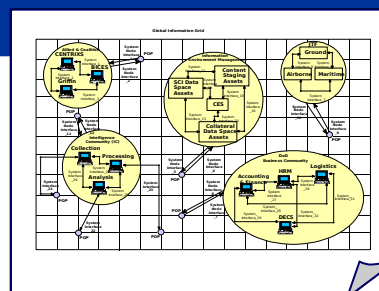
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Activity Model and
Activity Decomposition OV-
5



Systems View SV-1 and SV-2

TECHNICAL SERVICE	STANDARD	CSI LAYER
Directory Information Networking (DNS)	Directory Enabled Networking Protocol	Application 7
Common Open Policy Services (COPS)	COPS Protocol	Application 7
Common Information Model (CIM)	CIM/PLM Schemas	Application 7
Class of Service (CoS)	CoS Protocol	Network Routing 7
Routing Protocol Specification Language (RPLS)	RPLS Policy	Application 7
Internet Protocol (IP) Security Policy	IP Security Policy Protocol (SPP)	Application 7
Services User Agreement (SLA)	SLA Protocol on IP Network	Application 7
Net Generation (IP)	IP4 Protocol	Services Routing 3
Content Distribution and Management Storage Access (CDMS)	Network Data Management Protocol (NDMP)	Application 7
Open Directory Authentication Integration (ODAI)	LDAP Protocol	Application 7
Query Object Classes Management (QOCM)	Simple Object Access Protocol (SOAP)	Presentation 6
Universal Document Description (UDD)	Web Services Descriptive Language (WSDL)	Presentation 6
Dissemination of "Smart" Full or Broadcast Environment	XML-Over-Channel Link Reading Protocol (XLRP)	Link 2
Top Publishing or IP Publishing	Multi-Protocol Label Protocol Supporting XML	Transport 2
Mobile Ad-hoc Networking (MANET)	MANET Protocol	Network Routing 3
Mobile Computing	Mobile Computing	
Interpersonal Intelligent Agent	Name	
Heterogeneously Near-to Peer-to Peer (P2P) Protocol	Name	
Scalability	Name	
Survivability	Name	

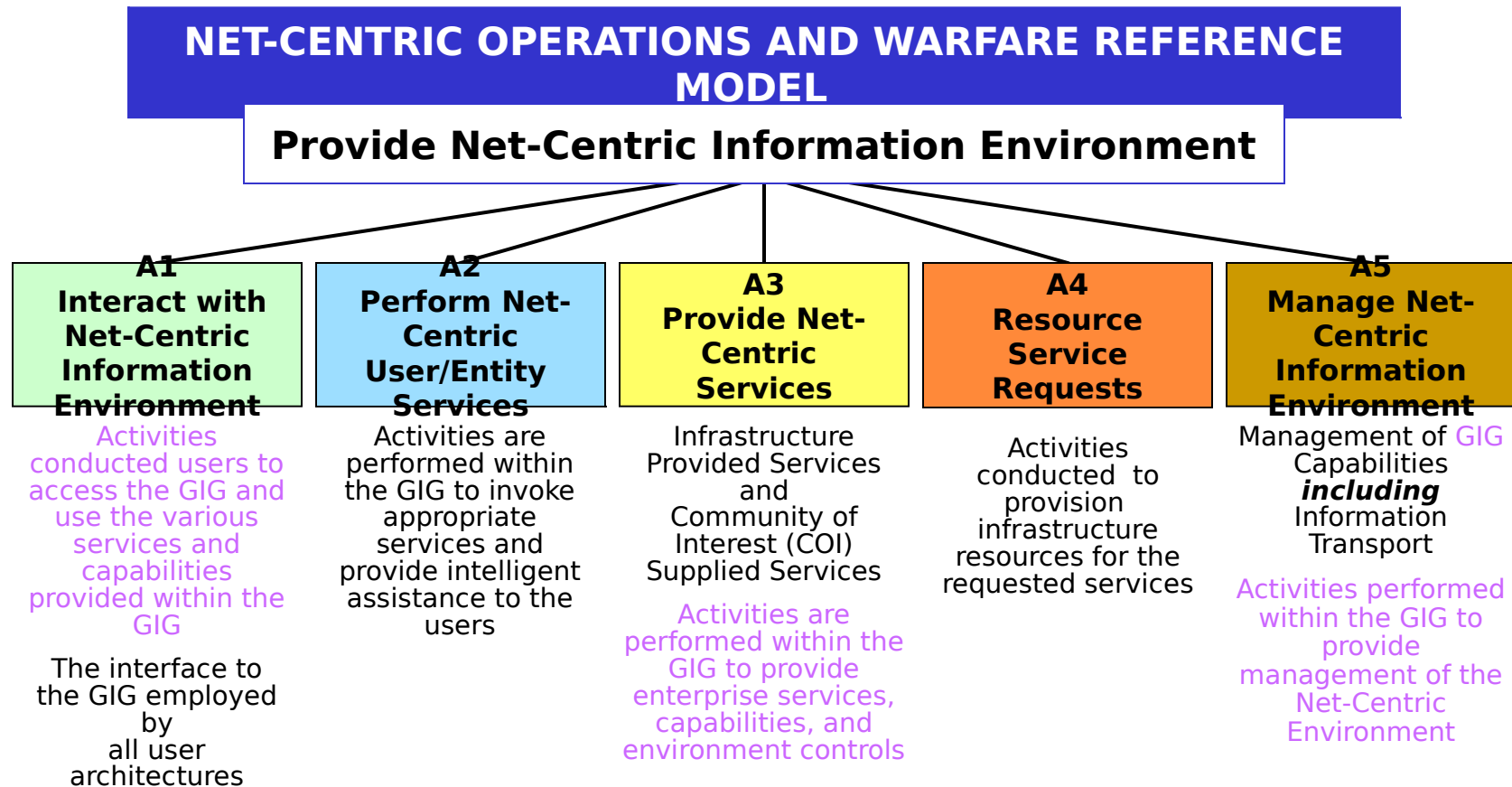
Target Technical View

First description of Net-Centricity at the Enterprise Level

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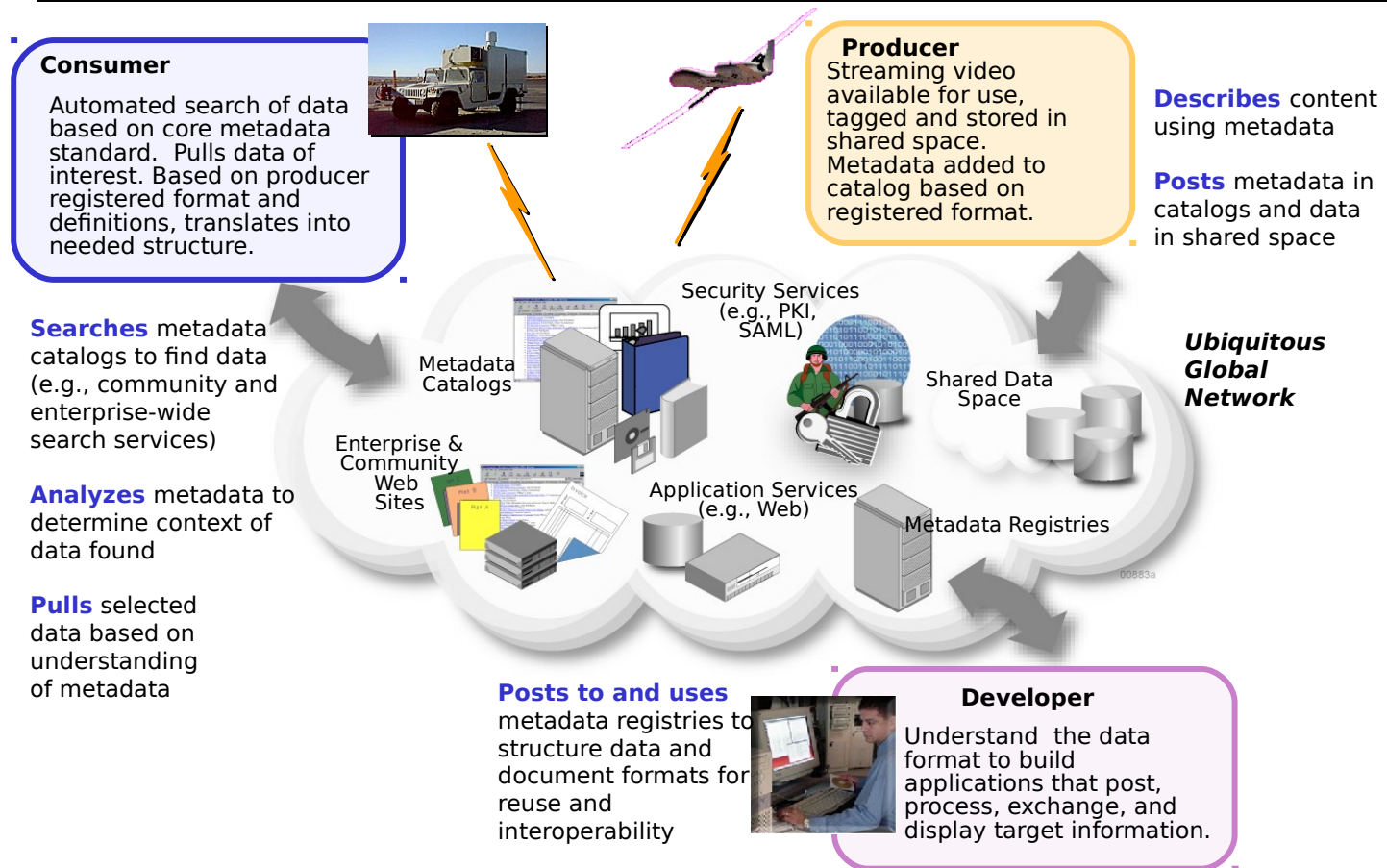
Reference Model Activity Decomposition





Net-centric Data Strategy

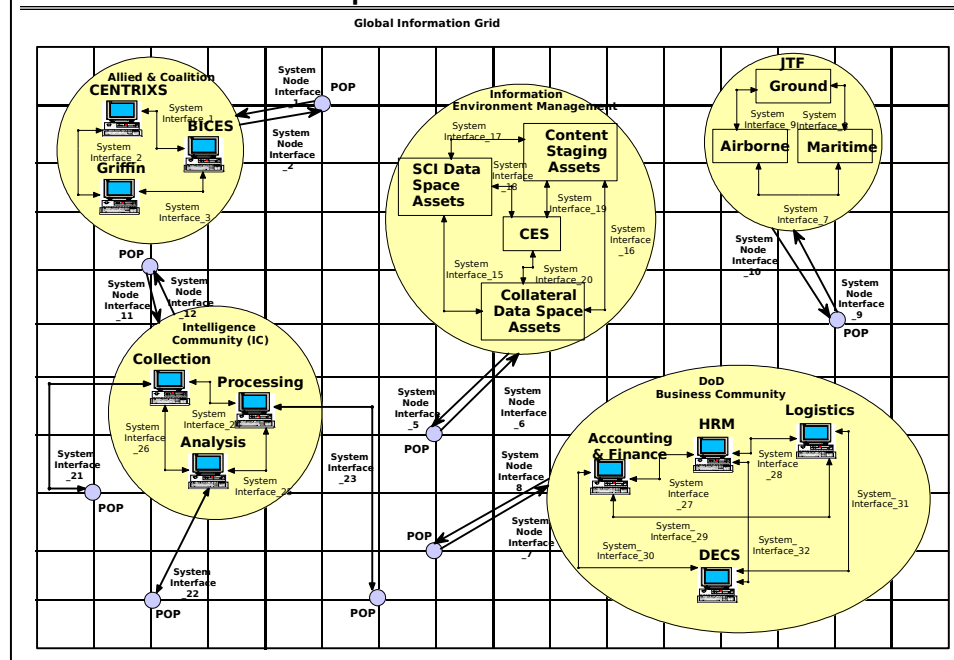
XML tagged data with appropriate infrastructure of registries and catalogues that makes data both visible and accessible



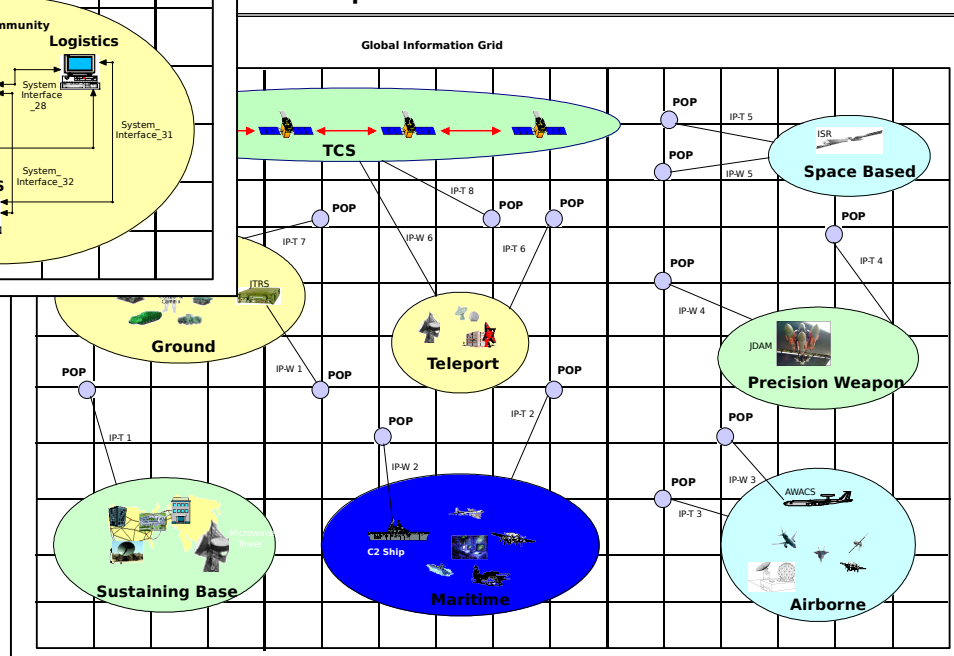
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Reference Model Systems View

Representative SV-1



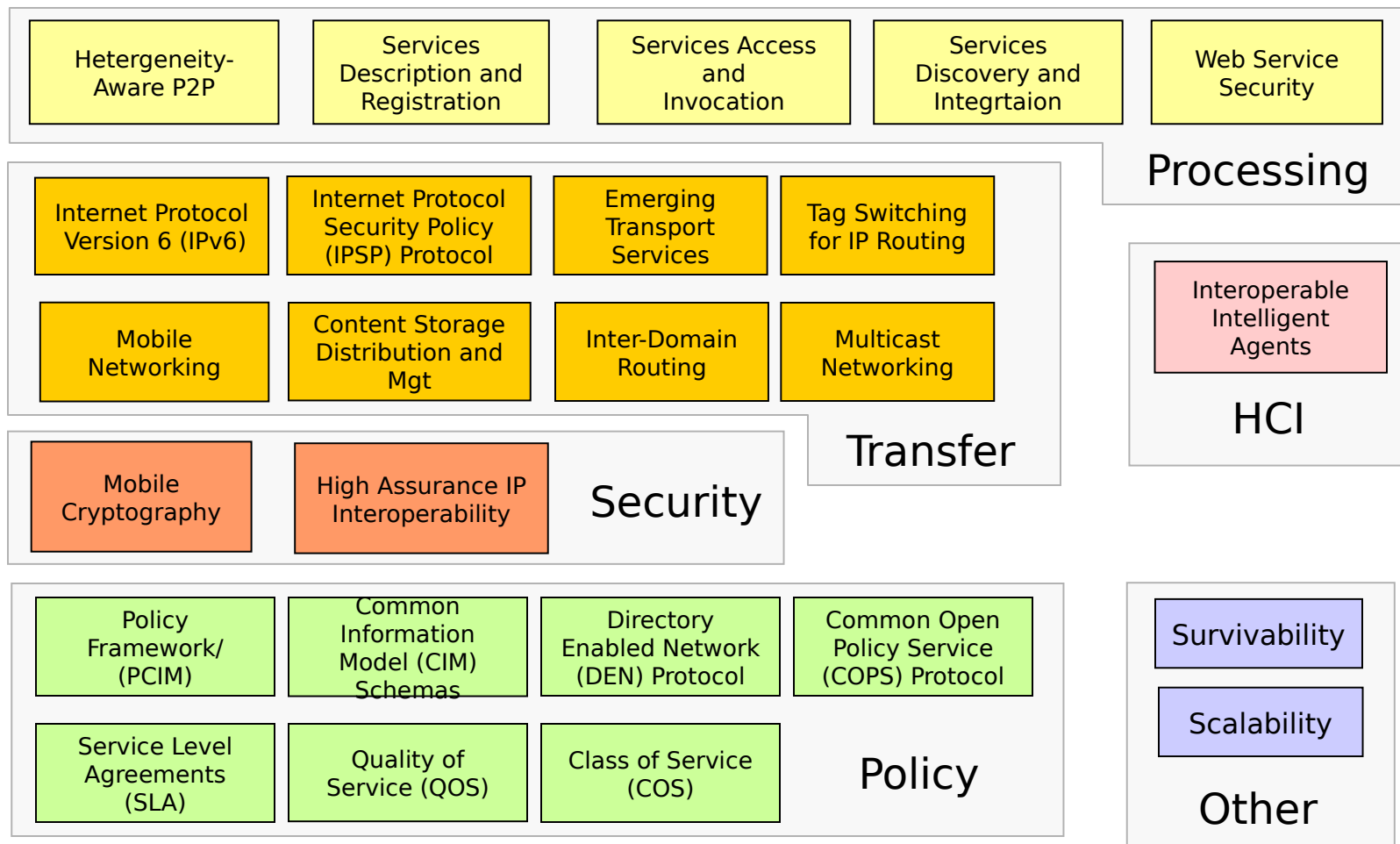
Representative SV-2



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Reference Model Target Technical View

Technical Areas by Core IT Category



Army Future Combat System (FCS)

Transformational Communications Office

Transformational Communications

Business Management Modernization Program

DISA (NCES Program)

National Defense Industrial Association Net-centric Operations Industry Forum



Reference Model Versions

- **Version 1.0**
 - Service Oriented Architecture
 - Approved Dec 03
- **Version 1.1**
 - Net-centric Data Strategy
 - DoD and Industry (NDIA) comments
 - Draft Version -- May 04
- **Version 1.2**
 - Net-centric Information Assurance Strategy
 - DoD and Industry (NDIA) comments
 - Draft Version -- July 04

Net-centric Constructs

- Language/taxonomy
- Service Oriented Architecture
- Data strategy
- Information Assurance strategy



GIG Architecture Compliance

- ✓ Architecture products comply with Architecture Framework product definitions and purposes
- ✓ Architecture data conform to the CADM
- ✓ IT/NSS standards derived from the DoD JTA (or presents case for new or unique standards as necessary)
- ✓ Conforms to the GIG Net-Centric Operations and Warfare Reference Model:
 - ✓ Uses Reference Model definitions and vocabulary
 - ✓ Incorporates Reference Model OV capabilities and services in the materiel solution
 - ✓ Net-centric Data Strategy
 - ✓ Net-centric Information Assurance Strategy



Compliance is verified by inspection and

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GIG Architecture Web Site

<https://disain.disa.mil/ncow.html>



Questions?



Background

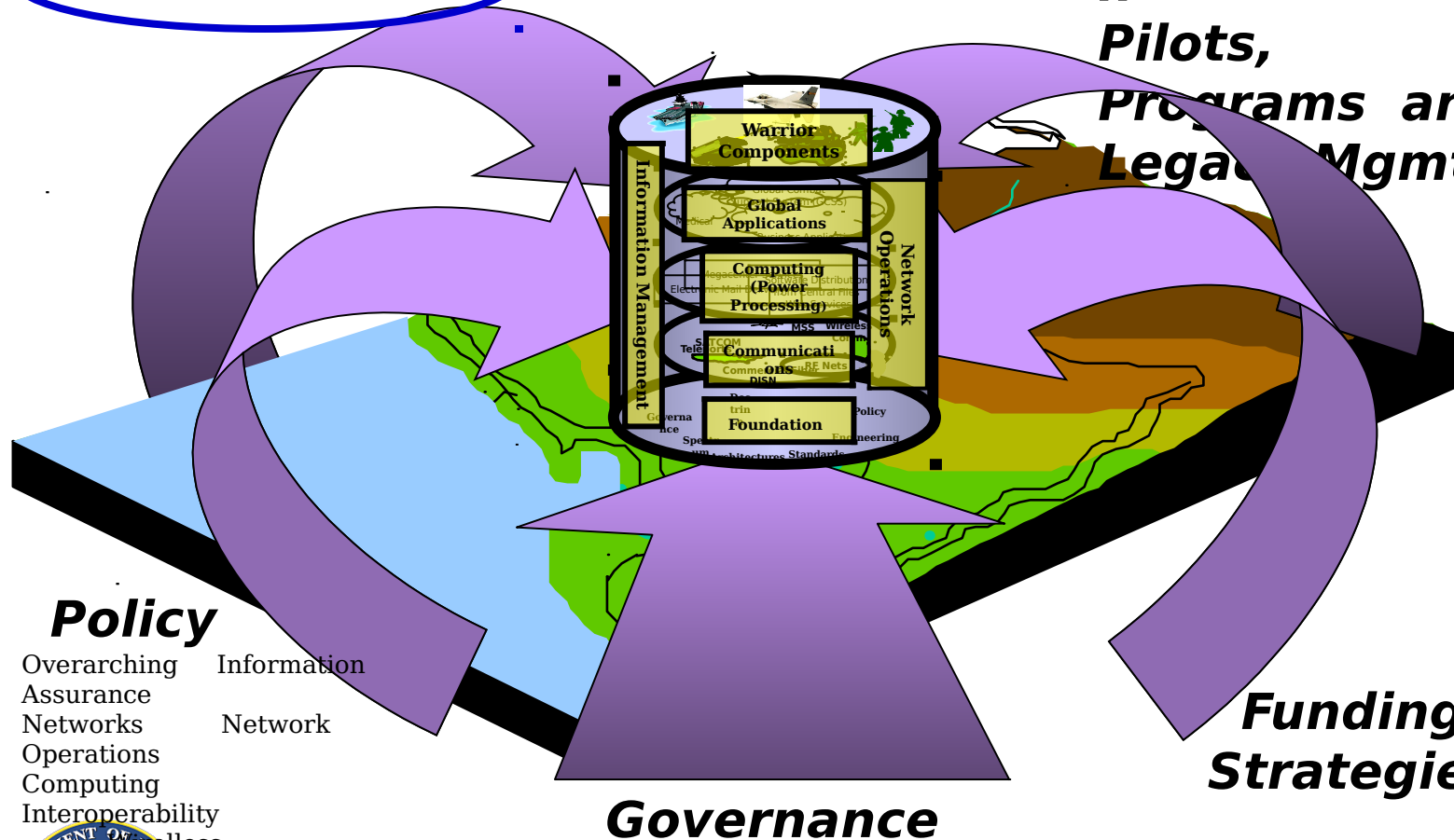
- Clinger-Cohen Act, 1996 (Information Technology Management Reform Act)
 - Directs “Agency” (DoD) CIO to develop/maintain an **Information Technology Architecture (ITA)**
- OMB Directives
 - Describe the Business Model/Processes and Arch Descriptors
 - **Federal Enterprise Architecture**
- DoD Policy changes incorporating architecture
 - DoDD 8100.1, Global Information Grid Overarching Policy
 - CJCSI 3170.01C, Joint Capabilities Integration and Development System
 - DoDD 5000.1, The Defense Acquisition System
- GIG Arch, Version 1.0 Approved by DoD CIO -- Aug 2001
- GIG Arch, Version 2.0 Approval by DoD CIO -- Aug 2003
- **Net-Centric Operations and Warfare Reference Model**
 - **Version 1.0 approved for use, Dec 2003**



Global Information Grid

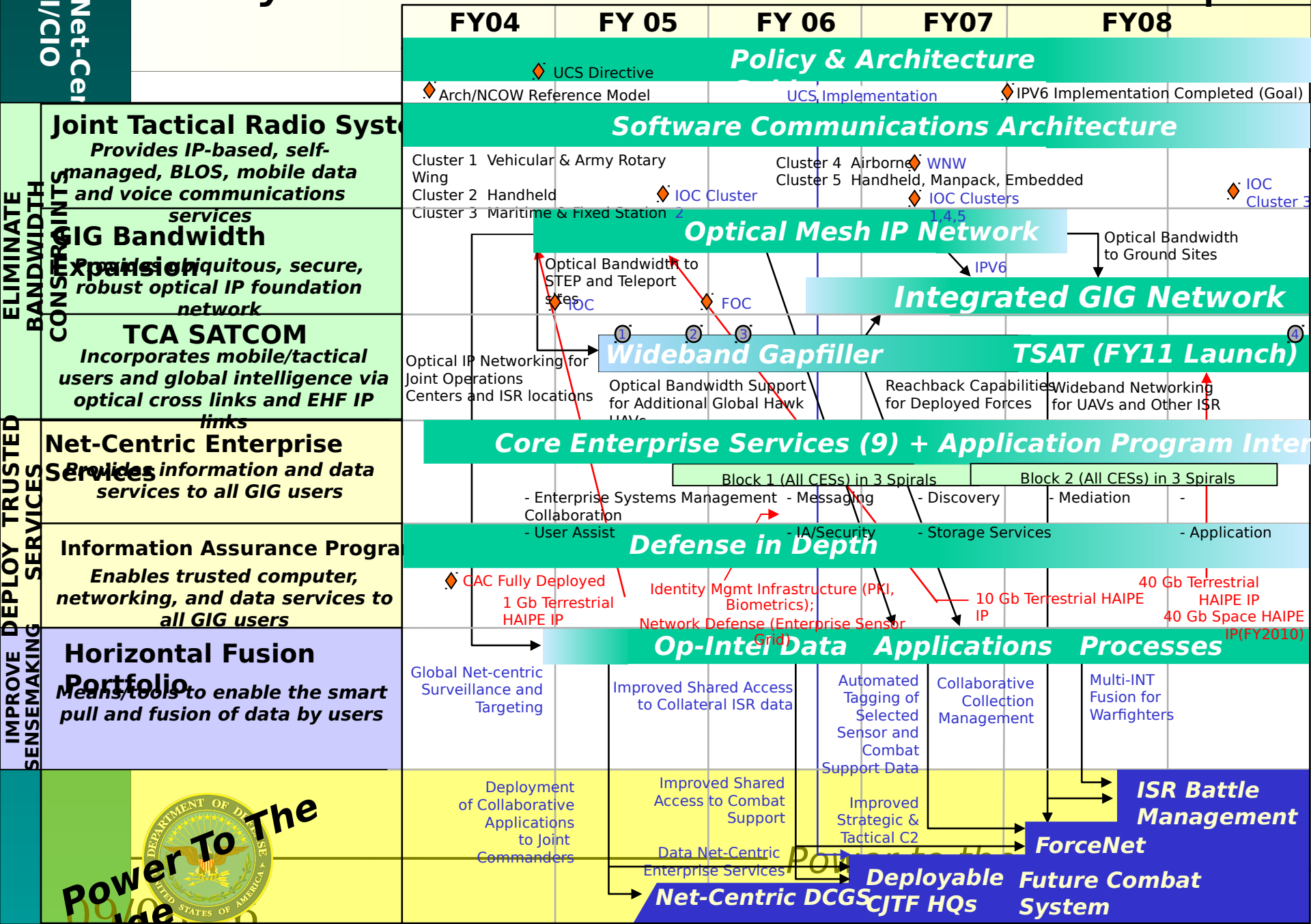
- **GIG CRD**
- **GIG Architecture**

Implementation -
Pilots,
Programs and
Legal Mgmt



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Key Net-Centric Initiatives Roadmap



GIG Architecture

Version 1.0

AS-IS Architecture



Joint Task Force Model

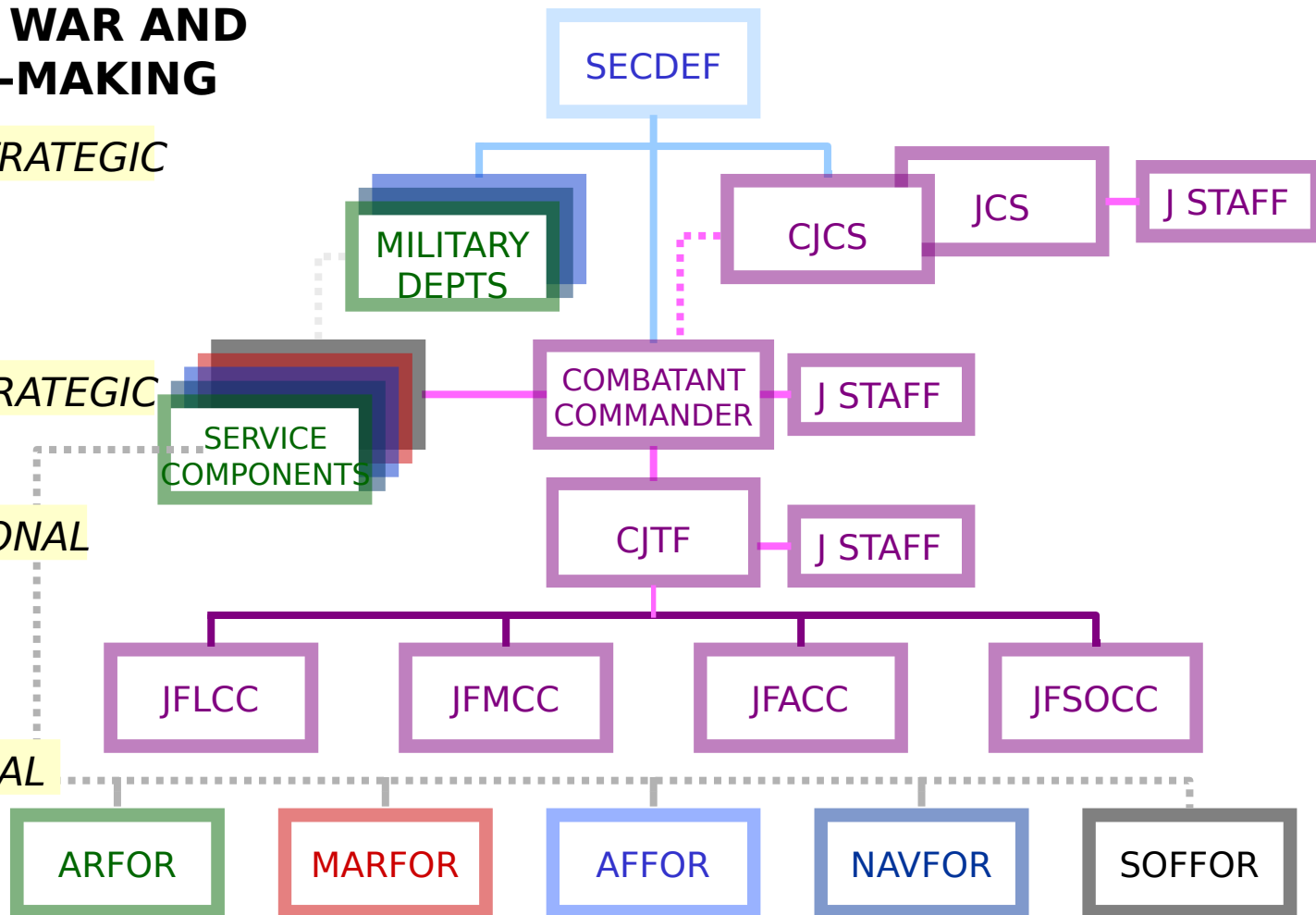
LEVELS OF WAR AND DECISION-MAKING

NATIONAL STRATEGIC

THEATER STRATEGIC

OPERATIONAL

TACTICAL



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GIG Arch V1.0

One Integrated Architecture: Three Views

Joint Operational
Architecture (JOA)

CINC
Architectures

Functional
Architecture
Data

Computing
and Comms
Templates

Joint
Technical
Architecture

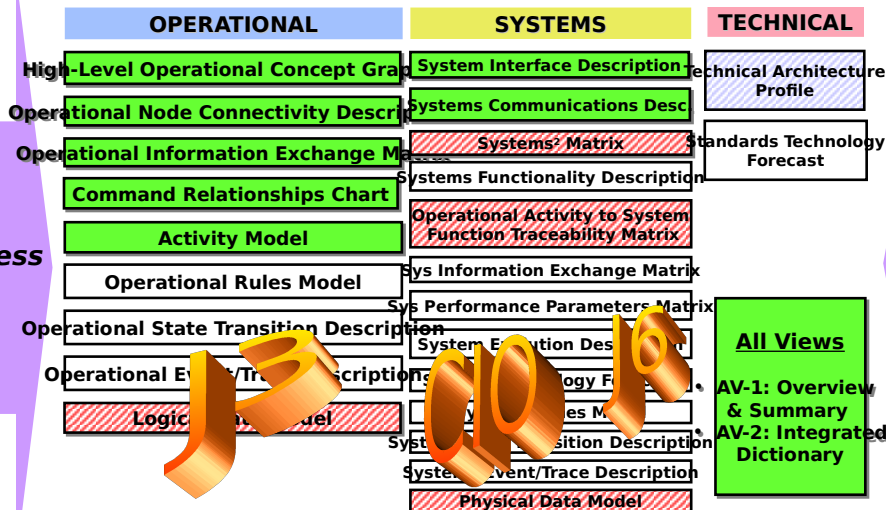
C4ISR Architecture Framework -
compliant
Warfighting Focus
Joint Mission Areas
NetOps
Integrate Extant Architectures

Functionals

- **Intell**
- **Logistics**
- **Health Affairs**
- **Personal & Readiness**
- **Finance**

**Comm and
Computing
Systems View**

**Mandated
and
Evolving
Standards**



"As-Is" - 2001

"To-Be" - 2010

Service
Enterprise
Level
Architectures

National
Level
Architectures

USCENTCOM AOR
Model: Joint Task
Force

Operational Scenario

Timelines Threats Joint Forces



Names”)

Functional/Information Requirements and Relationships

AORs ...

- Basis of Joint Ops Arch
- Joint Mission Areas
- PSA Functional Areas

Phase One Capabilities 9/2001 - 9/2003
SCI-Collateral Space Key Interface Technical Specifications
Initial Set - October 2001

Key Task	Milestone	Capability	Sub Capabilities	Standard Task	Status
Gain Code	Antenna high channel gain for all U.S.3	TR-000 (B)	Simultaneous operation of all antennas	Simultaneous operation of all antennas	TR
7 Antennas	SMC/72/FZ/F2	TR-000 (B)	Simultaneous operation of all antennas	Simultaneous operation of all antennas	TR
6 Receivers	TR-000 (B)	TR-000 (B)	Simultaneous operation of all antennas	Simultaneous operation of all antennas	TR

Standards and Conventions (mandatory and emerging)

Building Codes

- **Combatant Cmd Headquarters**
- **Major JTF Components**
- **Selected Weapons Systems**

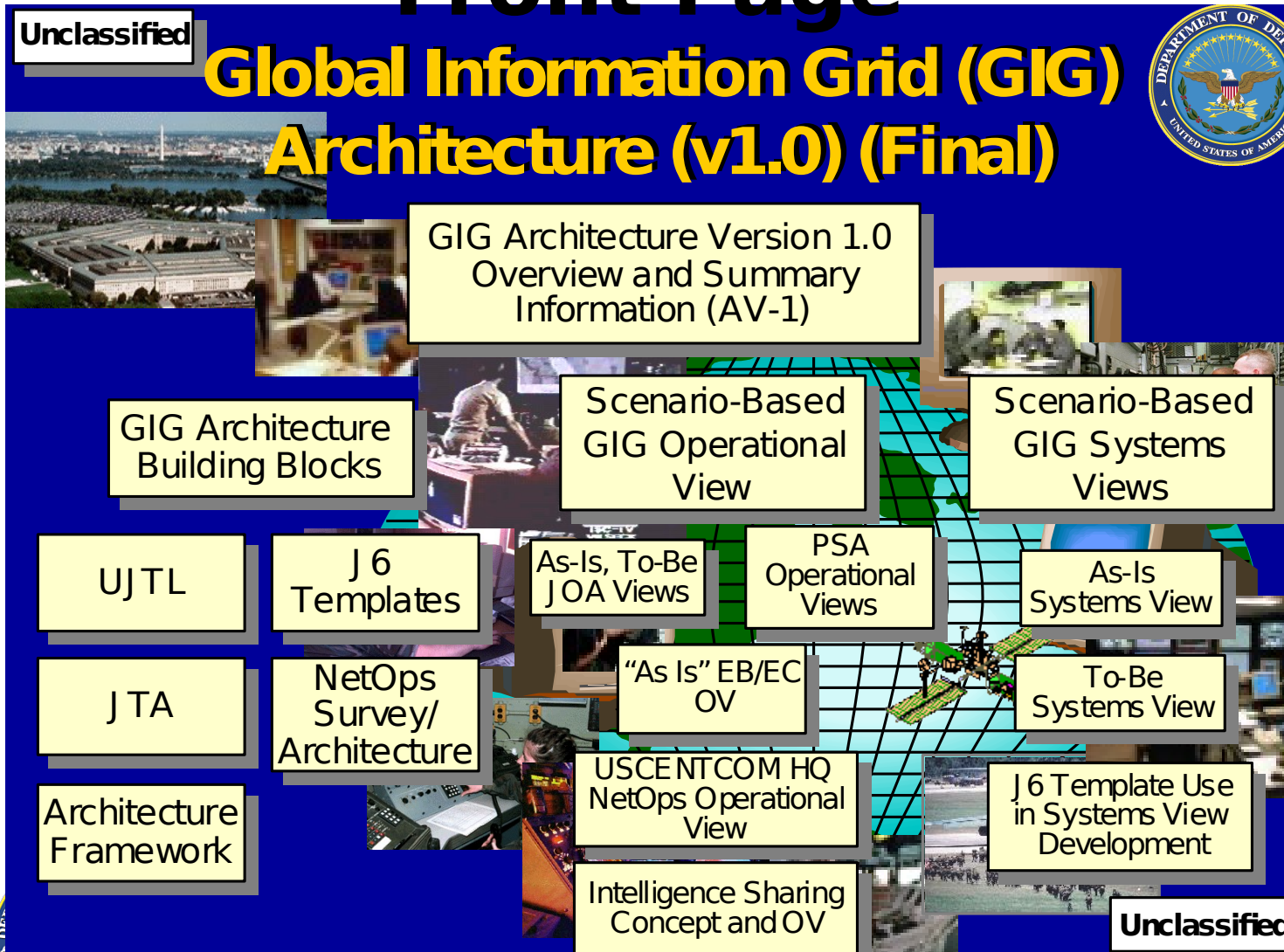
Technical View

- **Derived From JTA ref architecture**
- **Major DoD and IC interfaces**

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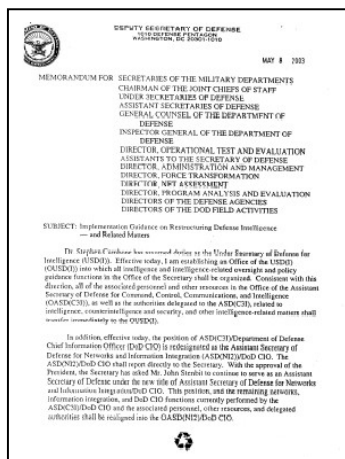
GIG Architecture, V1.0

“Front Page”



New Responsibilities

ASD(NII) and DoD CIO



The Assistant Secretary of Defense for Networks and Information Integration (ASD(NI2))/Department of Defense Chief Information Officer (DoD CIO) shall serve as the Principal Staff Assistant and advisor to the Secretary and Deputy Secretary of Defense on networks and network-centric concepts; command and control (C2), and communications; space policy; and enterprise-wide integration of DoD information matters, including information technology, information management, frequency spectrum management, information systems, information assurance, and related matters. The ASD(NI2)/DoD CIO shall take on increased responsibility for integrating all information and related activities and services across the Department.



Net-Centric Operations & Warfare

...The Emerging Way of War
An information Superiority-enabled concept of operations

that generates

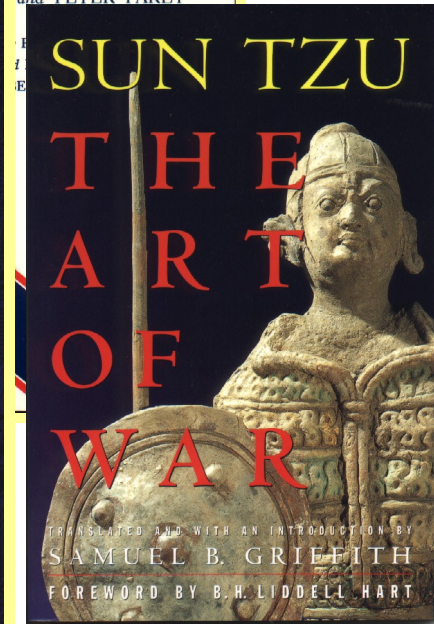
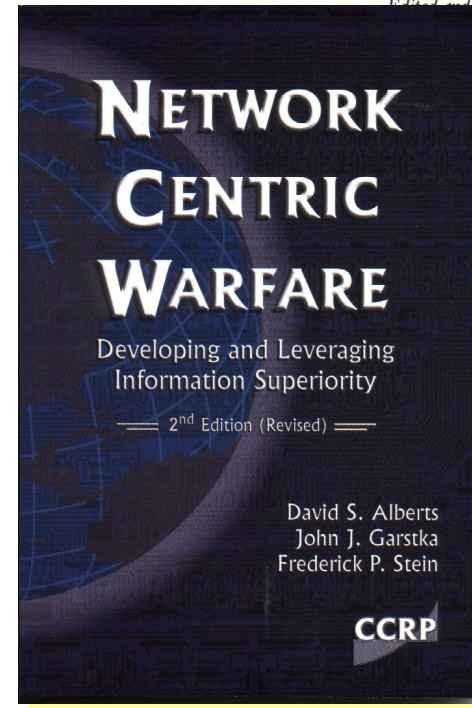
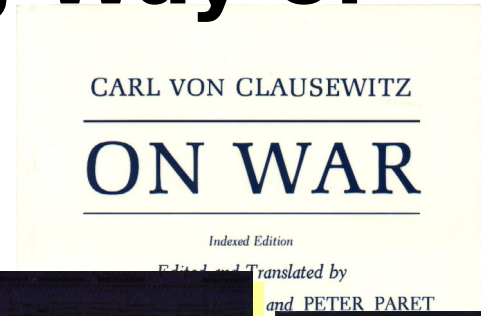
enhanced combat power by **networking** sensors, decisions makers, and shooters with increased **information sharing** and **collaboration**

to achieve

shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased



availability and a degree of self synchronization



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GIG Architecture

Version 2.0

TO-BE Architecture



GIG ARCHITECTURE v2

Purpose

Identify and describe required enterprise IT capabilities for Net-Centric Operations and Warfare

Chart the policy course for building and acquiring Net-Centric systems capabilities

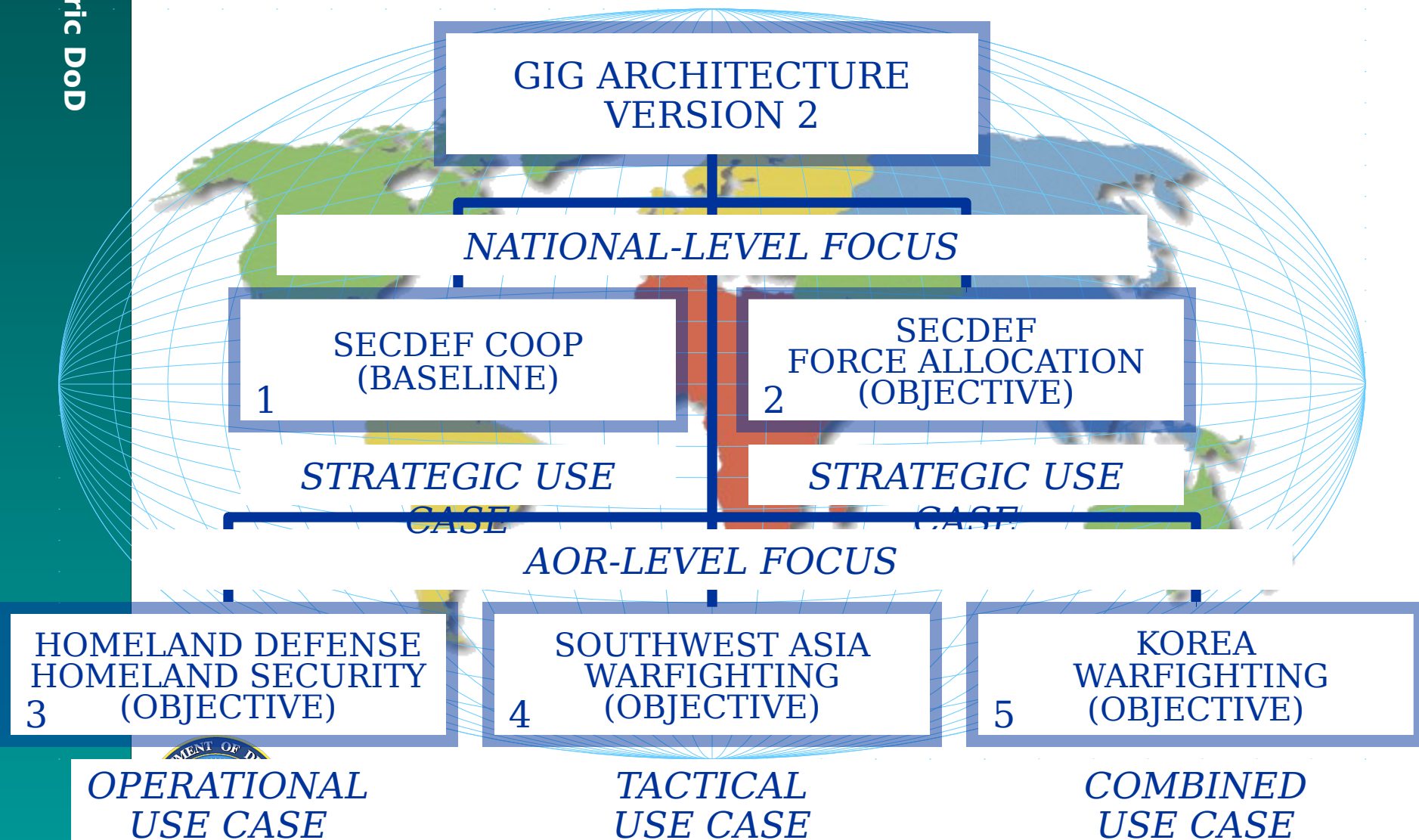
Support DoD transformation to a Net-Centric enterprise



GIG Architecture v2

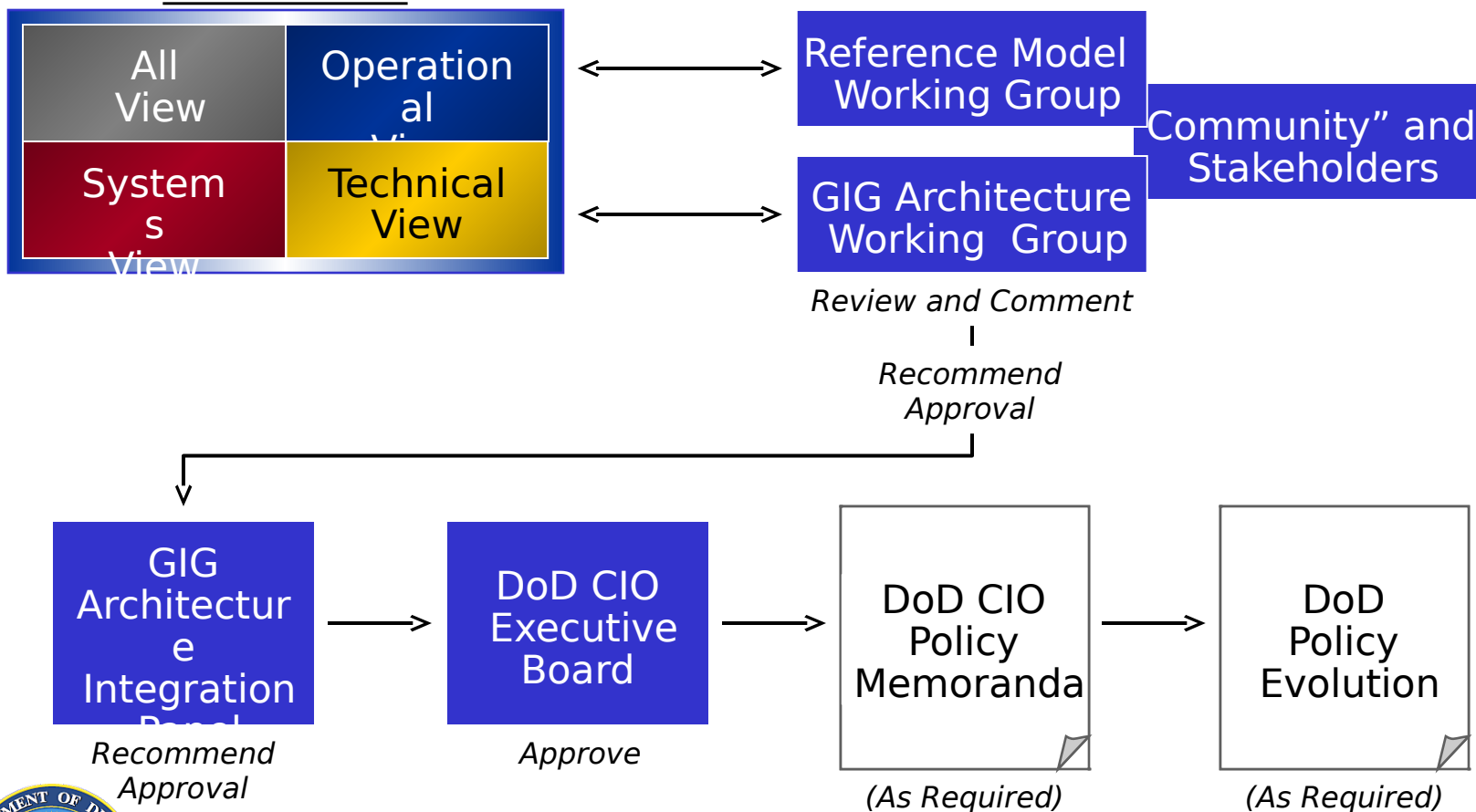
SCOPE

NET-CENTRIC OPERATIONS/WARFARE



Reference Model Approval Process

NCOW Reference Model Version 1.0



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What is the Reference Model?

- ✓ A *distillation* of GIG Architecture Version 2
 - Easier to use reference for Architecture Developers, Capabilities Developers, and Program Managers
 - The “standard” for describing net-centricity
- ✓ Built using the *architecture* constructs of the Framework
 - Operational, system and technical view products
 - Presented in a functional neutral form
 - Answers the question: “What’s different about net-centricity?”
- ✓ Defines the *core IT standards* required for net-centricity



Contains a “Target” Technical View

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